

ABSTRACT OF THE DISCLOSURE

An apparatus and method arranged to use a combination of at least electrical resistance heating and mechanical friction heating to cause a base material and/or a consumable material to reach a combination of temperature and pressure sufficient to cause welding. The method and apparatus configured for the simultaneous or substantially simultaneous application of both electrical resistance heating and friction heating to achieve welding is referred to as an electrofriction process, method or apparatus. This combination of resistance and friction heating allows the heating to be more localized within a relatively small weld zone, thereby improving the efficiency of the overall process and allowing the size, weight and strength and/or the cost of the application equipment and/or associated fixtures and power supplies to be reduced while enhancing its capability for operation in confined spaces and providing satisfactory welding performance.